CE

**DeviceNet**™

## SUPERPROX®
## Ultrasonic
## Proximity
## Sensors

### Up to 8 Meter Range
### Proximity Sensing

- **Sensing ranges of 1 m (39"), 2 m (79"), and 8 m (26')**

- **Reliable detection with simple on/off control of the output**

- **Easy push-button setup or optional hand-held setup/ display accessory available for all**

- **Self-contained, 30 mm barrel, in either ULTEM® plastic or SS303 stainless steel housing**

- **Resistant to caustic materials and harsh environments**

- **Field programmable capability**

- **DeviceNet capability**

- **CE certified**

### 30 mm ultrasonic proximity sensors offer model selections for range, output type, response time, default window, and transducer face

Whether the object being detected is just a few inches from the sensor or as far away as 26 feet, or the application calls for a specific sensor configuration, the SUPERPROX® Model SM900 series of ultrasonic sensors offers a variety of proximity sensing solutions. There is the mounting convenience of a 30 mm housing, sensing ranges of 1 m (39"), 2 m (79"), and a long-range 8 m (26'), the shortest deadbands in the sensing industry, and unique factory configurability to meet the user's needs. In addition to sensing ranges, model selections include normally-open or normally-closed NPN and PNP outputs, complementary NPN or complementary PNP outputs, and a variety of response times and default sensing window setup limits. By using the Model Reference Guide to select the specific model required, the user is assured of a reliable, cost-effective proximity sensing solution for a multitude of applications.

All models in this series are equipped with a push-button to set the limits for the sensing "window."

When it is impractical to use the push-button for setting long-range sensing limits, an optional, hand-held, setup/display accessory is available. All limits are stored in nonvolatile memory and thus are retained if power is removed from the sensor.

The sensors are available in either ULTEM® plastic or SS303 stainless steel housings. Both housings are sealed to withstand dusty, dirty, clean-in-place, non-condensing humidity, and high-pressure washdown environments. Unlike other sensing technologies, these sensors are capable of detecting all materials regardless of color, shape, and composition (transparent or opaque, liquid or solid) including clear glass, powder, food products, metal, plastics, and objects that change colors. They are virtually unaffected by changing light conditions, colors, and noise. Packaged in a 30 mm, threaded housing with jam nuts, the Model SM900 sensors are easily mounted in normally tough-to-install areas of the plant. With protection ratings of NEMA 4X (indoor use only) and IP67, the sensors resist most acids, bases, and oils, including most food products. All the sensors in this model series are CE certified. Additionally, the Model SM900 series sensors offer compatible integration with most programmable logic controllers.

SUPERPROX® PROXIMITY SENSORS

## 1 meter and 2 meter models

The standard 1 meter and 2 meter models are identified in the Model Reference Guide as the Model SM900A-1 and Model SM900A-4 sensors, respectively. These models provide for proximity sensing as close as 50.8 mm (2") from the sensor within the 1 m (39") range and 120 mm (4.7") from the sensor within the 2 m (79") range. To ensure ease of mounting, the length of the connector model, excluding the connector/cable assembly, is just 96 mm (3.78"). These sensors operate on a sonic frequency of 200 kHz and are available with response times as fast as 10 ms. The transducer face is made of FDA approved silicone rubber.

For proximity-sensing applications in severe, corrosive-type environments, the Model SM900A-7STS sensor has an SS303 stainless steel housing and is equipped with an SS304 stainless steel-faced transducer. This model series with a sensing range of 120 mm to 1 m (4.7" to 39"), provides reliable operation in either the detection of certain chemicals and corrosive materials or where caustic cleaning solutions are used in washdowns of machinery and equipment in close proximity to the sensor. For out-of-doors proximity-sensing applications, where cold weather is a factor, this corrosion-resistant model series provides reliable operation in temperatures as low as -20° C (-4° F).

## 8 meter, long-range models

No other proximity sensor has the combination of short deadband, long sensing range, and small housing package as does the Model SM900A-8 series of long-range, ultrasonic sensors. Configurable for long-range proximity sensing applications requiring a simple on/off output, these ultrasonic sensors detect objects of all materials over a sensing range from just 203 mm (8") to 8 m (26'). With the length of the cable model only 116.31 mm (4.579"), a fraction of the length of other long-range sensors, these sensor models are easy to mount in covers and tight spaces in the plant. They operate on a sonic frequency of 75 kHz with a standard response time of 200 ms. A response time of 100 ms is also available. An epoxy transducer face allows the fully encapsulated sensor to perform in a wide range of harsh environments, including those involving most acids, bases, and oils.

## Model Reference Guide - SM900 Series

Use the guide below to ensure the correct model number is specified for the application. Please note that not all sensor model combinations are available.

**EXAMPLE MODEL:**        SM9 5 0 A - 1 0 0 000 -

**SUPERPROX® Product Series**

**Power/Connection Type**
0...12 to 24 VDC / cable style
5...12 to 24 VDC / connector style

**Sensing Type**
0...Proximity - on/off

**Design Level**
A...Applies to all models

**Sensing Range**
1...51 mm to 1 m (2" to 39")
4...120 mm to 2 m (4.7" to 79")
7…120 mm to 1 m (4.7" to 39") - Required for ST option
8…203 mm to 8 m (8" to 26')

**Output Type**
0...Normally open (N.O.) - NPN & PNP
1...Normally closed (N.C.) - NPN & PNP
2...Complementary NPN outputs
3...Complementary PNP outputs

**Response Time - On/Off**
0...Standard: 25 ms (1 m) / 35 ms (2 m) / 250 ms (8 m)
1...Fast: 10 ms (1 m) / 15 ms (2 m) / 100 ms (8 m)
2...100 ms (1 m/2 m)
3...250 ms (1 m/2 m)      5...1.000 s (1 m/2 m/8 m)
4...500 ms (1 m/2 m/8 m)     6...2.500 s (1 m/2 m/8 m)

**Functionality**
000...Standard default window: $\pm$ 6.35 mm (0.25") (1 m/2 m);
       $\pm$ 63.5 mm (2.50") (7.6 m)
001...Default window: $\pm$ 12.7 mm (0.50") (1 m/2 m)
002...Default window: $\pm$ 25.4 mm (1.00") (1 m/2 m)
003...Default window: $\pm$ 2.54 mm (0.10") (1 m/2 m)
004...Default window: $\pm$ 9.52 mm (0.375") (1 m/2 m)
090...Default window: $\pm$ 51 mm (2.00") (1 m/2 m)

**Options**
   ...No designator indicates no options (standard)
ST...Stainless transducer (must also specify stainless
       housing; available in 120 mm to 1 m models only)
FS...Fluorosilicone transducer face (1 m models only)
AD...Limits push-button disabled
OB...Object mode

**Housing Types**
   ...No designator indicates standard ULTEM®* plastic housing (standard)
S...SS303 stainless steel (1 and 2 m models only)

\* ULTEM® is a registered trademark of The General Electric Company.

## Applications

Applications for these long-range proximity sensors extend to most every industry or business requiring reliable detection within the range of 8 meters (26 feet). By virtue of the 75 kHz frequency, the sensor's wide, 20° beam is especially effective in detecting objects with a variety of surface profiles. In applications where high sound absorption conditions exist in the material being sensed, and either the one or two meter range model sensor becomes unreliable because of lost energy, the more powerful long-range SM900A-8 can provide the solution when used in the shorter-range distances.

Temperature compensation allows these sensors to operate reliably in outdoor applications in temperatures ranging from -20° to 60° C (-4° to 140° F).

## Operation

The Model SM900 series is a self-contained, pulse-echo, proximity sensing device that both transmits and receives sonic energy within specified sensing ranges. Operating on 12 to 24 VDC, and employing the latest piezoelectric and microprocessor technology, these sensors detect only those designated objects within a set "window" and ignore all surrounding sonic interference.

Prior to operation, a simple and easy push-button "teach" function is used to set the sensing window limits. The near and far limits of a desired sensing window can be set anywhere within the sensing range and may be set to either encompass the full sensing range or be as small as desired. The push-button setup allows a window to be set as small as 2.54 mm (0.10") within the 1 and 2 m ranges and, depending on ambient conditions, a window within the 8 m range can be as small as 102 mm (4.0"). A double press of the SETUP push-button makes possible the setting of a default window anywhere within the sensing range.

The sensors are equipped with a multicolor sensing status LED and an amber LED. The amber LED shows the state of the output. When the output is active, the amber LED is on. When the output is not active, the amber LED is off. The multicolor LED indicates the position of the object relative to the sensing window limits: green when the object is inside the window; red when the object is outside the window; and off when the object is outside the sensing range.

Two different sensing program configurations, both employing foreground and background suppression, are available in the SM900 series, depending on the sensing application.

The standard sensing configuration, used in most proximity sensing applications, calls for the sensor to operate in a "background sensing mode." In this mode, the sensor can detect objects either directly or retroreflectively by doing a break-beam technique with a fixed background target. When objects are of irregular shape or non-repeatable orientation, break-beam sensing with a fixed background target should be used. After the sensing window is set to sense an object or the background target, the sensor continually transmits sonic pulses.

When the first pulse echo is received after each transmission pulse, the sensor shuts off its receiver and interrogates the elapsed travel time of the received first echo to determine whether the ob-

ject is in or out of the sensing window. The sensor's receiver then waits for the next echo to interrogate. When either no echo is received, or the first echo received off an object travelsa lesser or greater distance than the window distance, the sensor determines there is no object present. When sensing objects by break-beam with a fixed background target, the sensor determines there is no object present whenever receiving echoes off the background target.

An optional "object sensing mode" configuration is recommended when the sensor must sense objects beyond a foreground surface having an opening that permits reception of the pulse echoes. An example would be the sensing of an object through a grid or inside a narrow opening. Sensing in this mode is done by setting the sensing window limits beyond the foreground surface. During operation, the sensor receives all pulse echoes from objects in front of it, including the foreground surface, without interruption. But, in this mode, the discriminating microprocessor permits the sensor to accept only those pulse echoes from objects that are within the sensing window limits and ignore any foreground objects.

**Exception:** Multiple echoes received off objects at either 1/2 or 1/4 distances from the sensor to the window may be accepted or confused as an object in the sensing window. This is avoided by mounting the sensor in a position where this condition cannot exist.

## Setting the Window Limits

Located on the backside of the sensor, the SETUP push-button is used to set both the near and far window limits within which the sensing is to take place. Before the limits are set, the sensor must be properly aligned with the object to be detected.

To set the near and far limits, depress the SETUP push-button (the multicolor LED rapidly flashes amber to indicate the push-button is being pressed) until the multicolor LED flashes green in about 3 seconds, and then release the SETUP push-button. The multicolor LED continues flashing green indicating the sensor is waiting for the first window limit. Align a flat object parallel to the sensor face at the desired distance position for either (near or far) window limit, and press the SETUP pushbutton once. Upon release of the SETUP push-button, the multicolor LED

flashes amber indicating the first window limit is set and the sensor is waiting for the second window limit. Align a flat object parallel to the sensor face at the desired position for the second window limit and press the SETUP push-button once. Upon release of the SETUP push-button, the multi-color LED turns to the color that indicates where the object is located. The sensor has no time-out for setting limits.

While the SETUP push-button is depressed in setting either the first or second window limit, the multicolor LED will turn amber to indicate the sensor detects the object. If the sensor does not detect the object, the multicolor LED will turn red while the push-button is depressed and flash red 2 seconds when it is released. After the LED flashes red 2 seconds, it will either flash green if the sensor is requesting the first window limit again or flash amber if the sensor is requesting the second window again.

A special feature of these sensors allows the user to set an automatic default window of fixed size anywhere within the sensing range. For the 1 and 2 meter range models, the standard default window is 12.7 mm (0.50"). It is 127 mm (5.00") for the 8 meter range models. Other default window sizes are available for all the models upon request. To easily set the default window, while the multicolor LED is flashing green, align a flat object parallel to the sensor face at the center of the desired window and press the SETUP push-button twice in succession without moving the object. An automatic default window limit will be set at a distance equal to half the default window in front of and behind the flat-object surface nearest the sensor. If, for example, the functionality of the 1 or 2 meter range sensor calls for the standard default window, the sensing window is set with limits 6.35 mm (0.25") in front of and behind the object's front surface.

For long distances or tall-tank applications, when the sensor's push-button is not practical, an optional, Model AC441A Handheld Con-figurator can be used to set or change the near and far window limits and display the object distance when the sensor is located up to 200 feet from the user. The Model AC441A cannot, however, be used to set the default window.

Once set, the window limits are saved in nonvolatile memory and thus are retained when power is removed from the sensor.

SUPERPROX® PROXIMITY SENSORS

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## How Does it work?

During setup and operation, these SM900 series sensors continually and accurately measure the elapsed time of every pulse echo reception between each pulse transmission. The transmitted pulse begins a time clock to register the elapsed times for the received pulse echoes. Given the elapsed time, the sensor software calculates the distance traveled out to the object or surface and back to the sensor, using the formula, $D = TVs/2$, where: $D$ = distance from the sensor to the object; $T$ = elapsed time betweem the pulse transmission and its echo receptions; $Vs$ = the velocity of sound, approximately 1100 feet per second.

During operation, the calculated distance (D) between the sensor and the object is compared to the distances associated with the window limits. These limits are shown in the illustration at lower right as Dwi and Dwo.

If D is within these limits, an output is generated. The output remains on

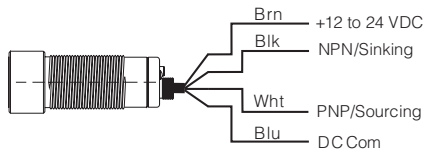## Electrical Wiring

The sensor wires must be run in conduit free of any AC power or control wires.
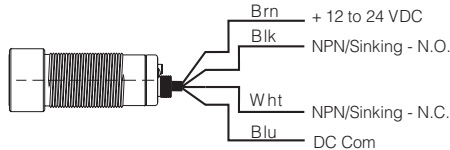
## Cable/Connector Wire Colors and Outputs
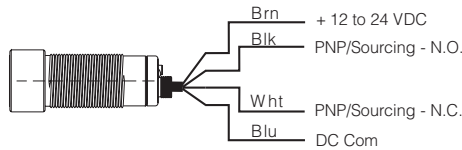
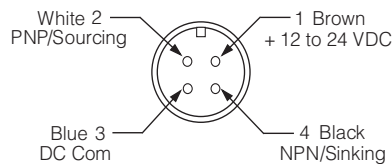### Cable Model Wire Assignments

#### Sinking/Sourcing N.O./N.C.

Brn +12 to 24 VDC
Blk NPN/Sinking
Wht PNP/Sourcing
Blu DC Com

#### Complementary Sinking

Brn + 12 to 24 VDC
Blk NPN/Sinking - N.O.
Wht NPN/Sinking - N.C.
Blu DC Com

#### Complementary Sourcing

Brn + 12 to 24 VDC
Blk PNP/Sourcing - N.O.
Wht PNP/Sourcing - N.C.
Blu DC Com

### Connector Model Pin Assignments

#### Sinking/Sourcing N.O./N.C.

White 2 PNP/Sourcing — 1 Brown + 12 to 24 VDC
Blue 3 DC Com — 4 Black NPN/Sinking

#### Complementary Sinking

White 2 NPN/Sinking - N.C. — 1 Brown + 12 to 24 VDC
Blue 3 DC Com — 4 Black NPN/Sinking - N.O.

#### Complementary Sourcing

White 2 PNP/Sourcing - N.C. — 1 Brown + 12 to 24 VDC
Blue 3 DC Com — 4 Black PNP/Sourcing - N.O.
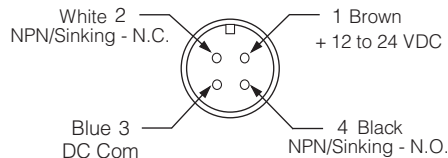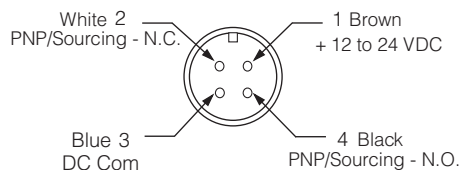
## NPN/Sinking and PNP/Sourcing Outputs

INTERNAL | EXTERNAL
BROWN — DC (+)
LOAD
BLACK
NPN
Current Limit
PNP
WHTE
Current Limit LOAD
BLUE DC Com
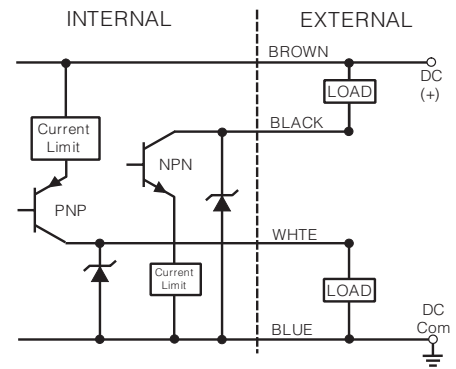
## Complementary NPN/Sinking Outputs

INTERNAL | EXTERNAL
BROWN — DC (+)
LOAD
BLACK
LOAD
NPN
WHTE
NPN
Current Limit
Current Limit
BLUE DC Com
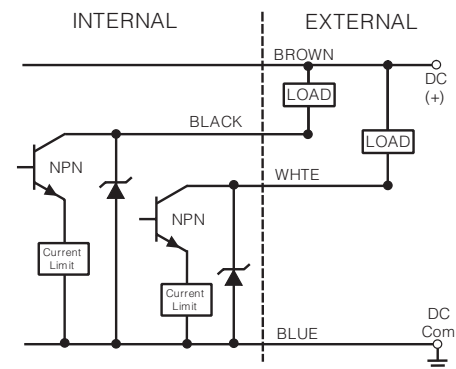
## Complementary PNP/Sourcing Outputs

INTERNAL | EXTERNAL
BROWN — DC (+)
Current Limit
Current Limit
PNP
PNP
BLACK
WHTE
LOAD
LOAD
BLUE DC Com
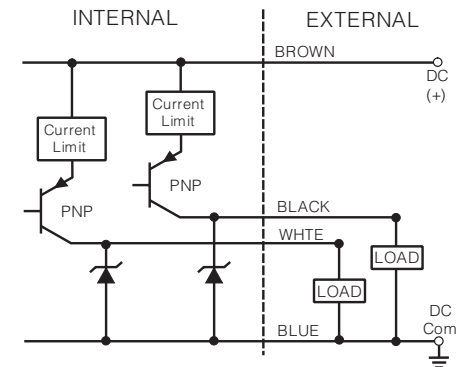
## Calculating Pulse Transmission

Deadband
Erratic operation within this range
PULSE
Dwo
Dwi
ECHO
Near Limit
Far Limit
D
OBJECT
SHADED AREA REPRESENTS THE SENSING AREA
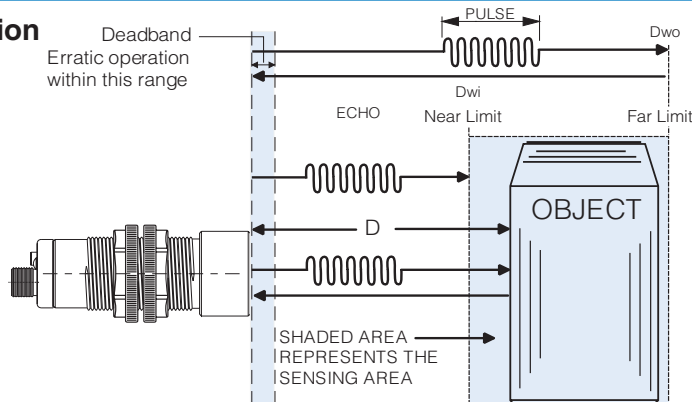
## Dimensions

### Cable Style
(ULTEM® plastic and SS303 stainless steel)
SM900A-1, SM900A-4, SM900A-7STS

Setup
Pushbutton

Multicolor
LED

94.95 mm
(3.738)

84.51 mm
(3.327)

20.10 mm
[.790]

Amber
LED

34.70 mm
[1.365]
DIA

28.30 mm
[1.114] DIA

M30 x 1.5 mm-6g
THREADS
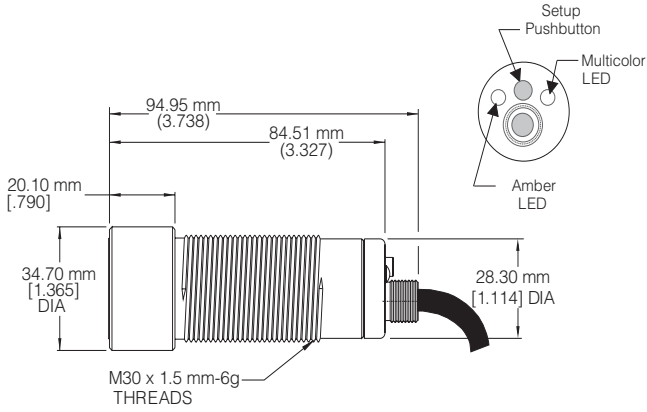
### Cable Style
(ULTEM® plastic & SS303 stainless steel)
SM900A-8 Long-range

116.31 mm
(4.579)

106.38 mm
(4.188)

42.09 mm
(1.657)

43.18 mm
(1.700) DIA

M30 x 1.5 -6g

28.30 mm DIA
(1.114)
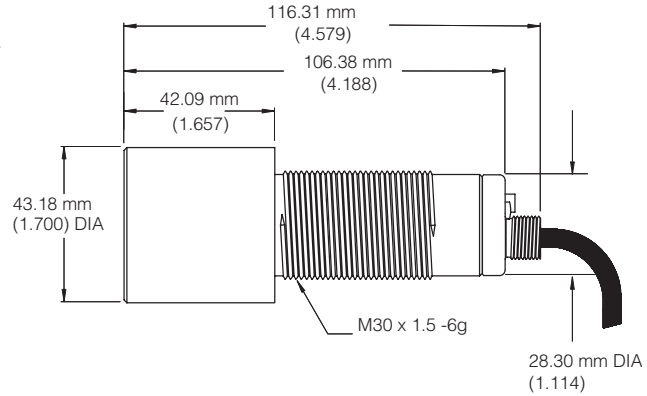
### Connector Style
(ULTEM® plastic and SS303 stainless steel)
SM950A-1, SM950A-4, SM950A-7STS

125.00 mm
[4.921]

84.51 mm
[3.327]

34.70 mm
[1.365]
DIA

AC130

95.99 mm
(3.779)

84.51 mm
[3.327]

20.10 mm
[.790]

2 - White          1 - Brown

3 - Blue          4 - Black

34.70 mm
[1.365]
DIA

28.30 mm
[1.114] DIA

M30 x 1.5 mm-6g
THREADS

M12 mm x 1 mm -6g
Threads

117.15 mm
[4.612]

84.51 mm
[3.320]

34.70 mm
[1.365]
DIA

.600

1.523

AC132

### Connector Style
(ULTEM® plastic & SS303 stainless steel)
SM950A-8 Long-range

Amber
LED

Pushbutton
Multicolor
LED

117.35 mm
(4.620)

106.38 mm
(4.188)

42.09 mm
(1.657)

2-White          1-Brown

3-Blue          4-Black

43.18 mm
(1.700) DIA

28.30 mm DIA
(1.114)

M30 x 1.5 -6g

(1.102) DIA

139.19 mm
(5.480)

14.7 mm
(0.580)

38.0 mm
(1.500)

AC132

147.04 mm
(5.789)

AC130          14.7 mm
(0.580)
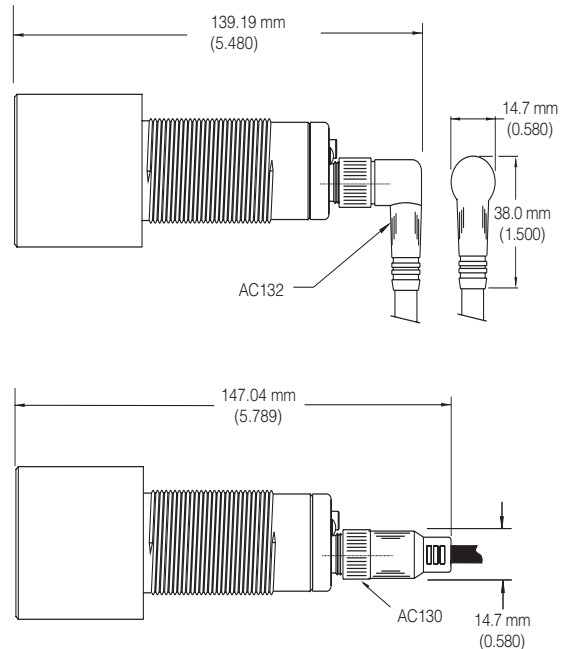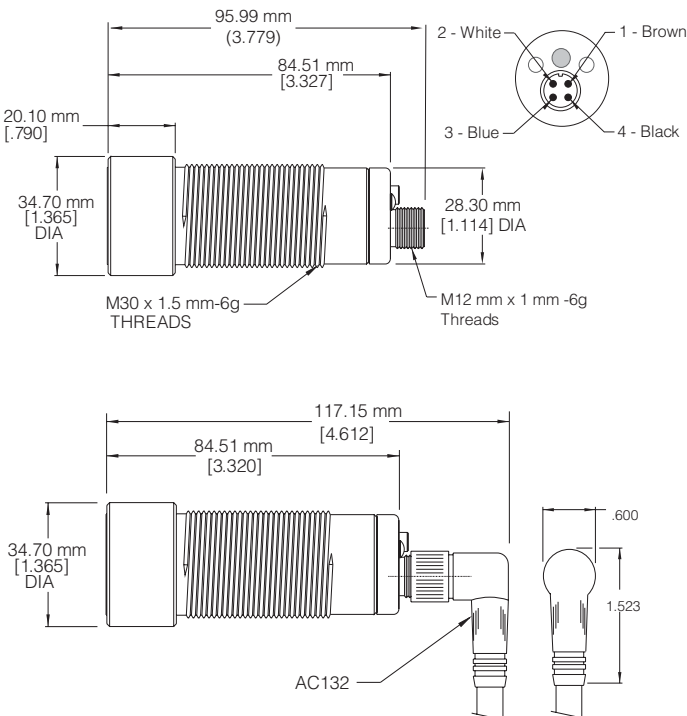
## Accessories
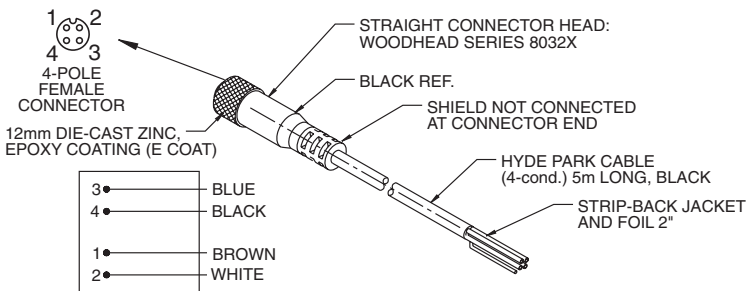
**AC130** Straight, M12 micro, 4-conductor, connector/cable assembly, 5 m (16'), for 30 mm, barrel-style sensors

**AC233** Small, right-angle, stainless mounting bracket for 30 mm, barrel-style sensors



4-POLE FEMALE CONNECTOR

12mm DIE-CAST ZINC, EPOXY COATING (E COAT)

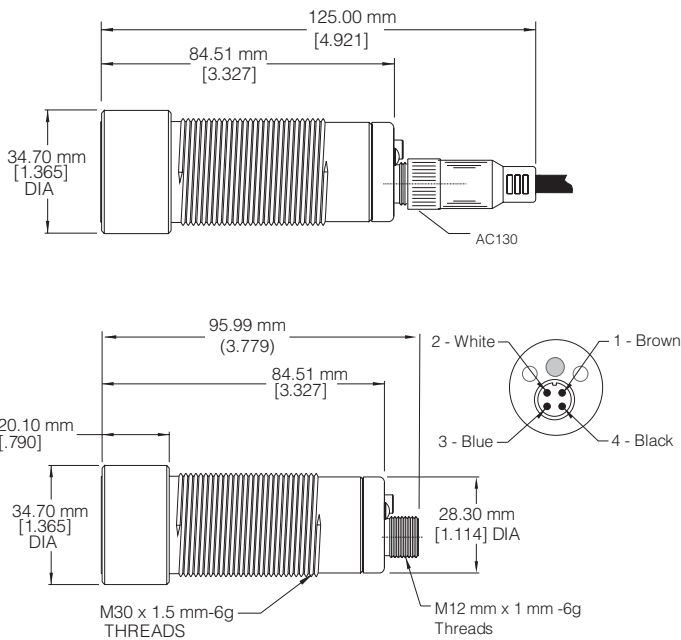STRAIGHT CONNECTOR HEAD: WOODHEAD SERIES 8032X

BLACK REF.

SHIELD NOT CONNECTED AT CONNECTOR END

HYDE PARK CABLE (4-cond.) 5m LONG, BLACK

STRIP-BACK JACKET AND FOIL 2"

3 — BLUE
4 — BLACK
1 — BROWN
2 — WHITE

**AC132** Right-angle, M12 micro, 4-conductor, connector/cable assembly, 5 m (16'), for 30 mm, barrel-style sensors



4-POLE FEMALE CONNECTOR

RIGHT-ANGLE CONNECTOR HEAD

3 — BLUE
4 — BLACK
1 — BROWN
2 — WHITE

#24/4 PVC INSULATED FINE STRANDED COPPER CONDUCTORS, YELLOW PVC JACKET, 300/500V, 80°C

5 meters [16' ft]

50.8 mm [2.0]
9.7 mm [.38]



7.92 mm [.312]
28.60 mm [1.126]
FULL R. TYP
29.36 mm [1.156]
7.14 mm [.281] (2x)
38.10 mm [1.500]
3.18 mm [.125]
R 3.18 mm [.125]

R .76 mm [.030] (4x)
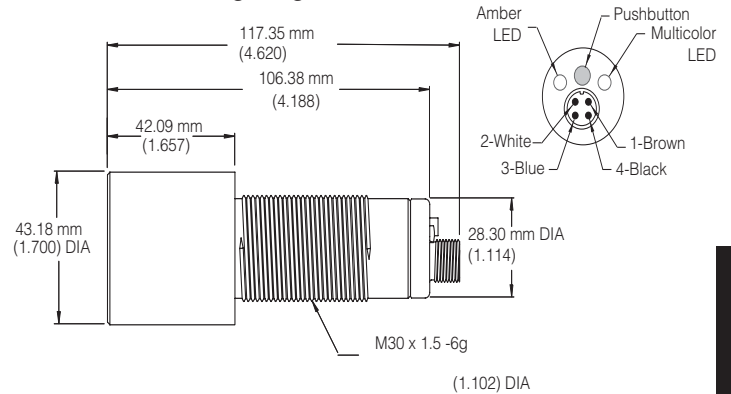6.35 mm /[.250] SLOT OPENING FOR WIRE CABLE TO PASS THRU REF.
2.36 mm WALL [.093] TYP REF.
R 22.22 mm [.875]
ø 32.54 mm [1.281]
38.10 mm [1.500]
60.33 mm [2.375]
R. 1.60 mm [.063]
22.22 mm [.875]
44.45 mm [1.750]
38.10 mm [1.500]

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## General Specifications

Sensing [TA = 20° C (68° F)]

### 1 and 2 meter ranges

**Model Sensing Ranges**
51 mm to 1 m (2.0" to 39")
120 mm to 1 m (4.7 to 39")**
120 mm to 2 m (4.7 to 79")
Sonic Frequency: 200 kHz
Minimum-size Detection
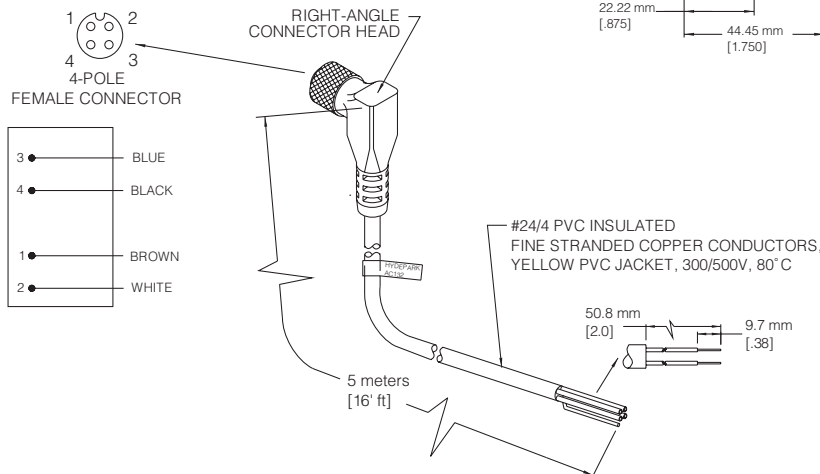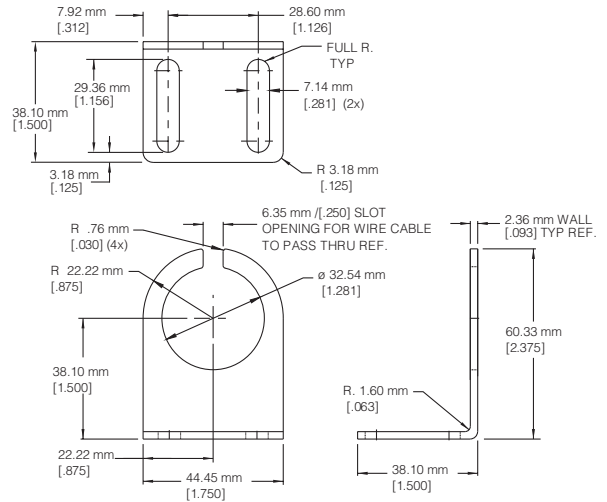(Model SM900A-1):
1.59 mm (0.0625") diameter rod up to 635 mm (25") distance from sensor
Maximum Angular Deviation:
$\pm$ 10° on 305 mm x 305 mm (12" x 12") flat target at a distance of 305 mm (12")
Sonic Cone Profile: See Beam Plots, Page 4-109
Limit Adjustment Resolution: 0.08 mm (0.003")
Repeatability: $\pm$ 0.8716 mm (0.03431") max. Temperature Compensated

### Power Requirements
Supply Voltage:
12 to 24 VDC $\pm$ 10% excluding output load (regulated supply)
Current Consumption: 100 mA max., excluding load
Peak Inrush Current: 0.50 Amp
Power Consumption: 1.2 W max., excluding load

### Outputs
Sinking Output (NPN):
Maximum on-state voltage @ 100 mA: 0.37 volt
Maximum load current: 100 mA
Maximum applied voltage: 35 VDC
Sourcing Output (PNP):
Maximum on-state voltage drop @ 100 mA: 0.50 volt
Maximum load current: 100 mA

### Response Times -
### Minimum, Standard
10 ms on/off, 20 ms on/off (1 m range models)
15 ms on/off, 30 ms on/off (2 m range models)
Other response times are available.

### Indicators
Multicolored (Amber, Red, Green) LED:
Indicates limits setup and operational modes.
Amber LED: Visual indicator for sensor output; illuminated when output is in an active (on) state.

### Connection Options
Cable Style: 24 AWG, foil shield, lead-free PVC jacketed, 4-conductor, 3 meters (10') long, standard
Connector Style: 12 mm, 4 pole, male

### Protection
Power Supply: current-limited over-voltage, ESD, reverse polarity
Outputs: current-limited over-voltage, ESD, over-current
**NOTE:** This sensor is **NOT RATED EXPLOSION PROOF.**

### Environmental
Operating Temperature Range: 0° to 50°C (32° to 122°F) for silicone-faced models
- 20° to 50°C (-4° to 122°F) for stainless steel-faced models
Storage Temperature Range: -20° to 80°C (-4° to 176°F) for silicone-faced models
-50° to 80°C (-58° to 176°F) for stainless steel-faced models
Operating Humidity: 100%
Protection Ratings: NEMA 4X (indoor use only), IP67
Chemical Resistance: Unaffected by most acids, bases, and oils.
Fluorosilicone- and stainless steel-faced transducers available for severe,

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corrosive-type environments.

## Construction

Dimensions:
  Cable Model: 30 mm (1.181") dia. x 1.5 mm - 6g threaded housing x 94.95 mm (3.738") mm long, including 34.70 mm (1.365") dia. x 20.10 mm (0.790") long sensing head
  Connector Model: 30 mm (1.181") dia x 1.5 mm-6g threaded housing x 95.99 mm (3.779") long; 117.15 mm (4.612") long, including AC 132 right-angle, M12 micro, connector / cable assembly; 125.00 mm (4.921") long, including AC130 straight, M12 micro, connector/cable assembly; sensing head dimension same as cable model.
Housing: Epoxy encapsulated to resist shock and vibration
Case: ULTEM®* plastic (FDA Approved) or SS303 stainless steel
Transducer Face: Silicone rubber - gray SS304 stainless steel, 0.051 mm (0.002") thick**
Sensor Cables: Lead-free, black PVC jacketed

Agency Approvals

CE Mark: CE conformity is declared to: EN61326:1997 (annex A, industrial) including amendment A1:1998. EN55011 Group 1 Class A
*Declaration of Conformity available upon request*

### 8 meter, long range

Model Sensing Range:
  203 mm to 8 m (8.0" to 26')
Sonic Frequency: 75 kHz
Minimum-size Detection (Model SM900A-8):
  50.8 mm (2.0") diameter rod up to 4572 mm (15') distance from the sensor
Maximum Angular Deviation:
  $\pm$ 10° on a large flat surface at a distance of 6.096 m (20')
  $\pm$ 5° on a large flat surface at a distance of 8 m (26')
Sonic Cone Profile: See Beam Plots, Page 4-109
Limit Adjustment Resolution: 0.254 mm (0.01")
Repeatability: $\pm$ 2.54 mm (0.10") max.
Temperature Compensated

## Power Requirements

Supply Voltage:
  12 to 24 VDC $\pm$ 10% excluding output load (regulated supply)
Current Consumption: 100 mA  max., excluding load
Peak Inrush Current: 0.50 Amp.
Power Consumption: 1.2 W max., excluding load

## Outputs

Sinking Output (NPN):
  Maximum on-state voltage @ 100 mA: 0.37 volt
  Maximum load current: 100 mA
  Maximum applied voltage: 35 VDC
Sourcing Output (PNP):Maximum on-state voltage drop @ 100 mA: 0.50 volt
  Maximum load current: 100 mA

## Response Times - Minimum, Standard

100 ms on/off,  200 ms on/off
Other response times are available.

## Indicators

Multicolored (Amber, Red, Green) LED: Indicates limits setup and operational modes.
Amber LED: Visual indicator for sensor output; illuminated when output is in an active (on) state.

## Connection Options

Cable Style:
  24 AWG, foil shield, lead-free PVC jacketed, 4-conductor, 3 meters (10') long, standard Connector Style: 12 mm, 4 pole, male
Protection
  Power Supply: current-limited over-voltage, ESD, reverse polarity
  Outputs: current-limited over-voltage, ESD, over-current
**NOTE:**
This sensor is NOT RATED EXPLOSION PROOF.

## Environmental

Operating Temperature Range: - 20° to 60°C (-4° to 140°F)
Storage Temperature Range: -40° to 100°C (-40° to 212°F)
Operating Humidity: 100%
Protection Ratings: NEMA 4X (indoor use only), IP67 Chemical Resistance: Unaffected by most acids, bases, and oils.

## Construction

Dimensions:
  Cable Model: 30 mm (1.181") dia. x 1.5 mm - 6g threaded housing x 116.31 mm (4.579") mm long, including 43.18 mm (1.700") dia. x 42.09 mm (1.657") long sensing head
  Connector Model: 30 mm (1.181") dia x 1.5 mm-6g threaded housing x 117.35 mm (4.620") long; 139.19 mm (5.480") long, including AC132 right-angle, connector/cable assembly; 147.04 mm (5.789") long, including AC130 straight, connector/cable assembly; sensing head dimension same as cable model.
Housing: Epoxy encapsulated to resist shock and vibration
Case: ULTEM®* plastic (FDA Approved)
Transducer Face: Epoxy - white
Sensor Cables: Lead-free, black PVC jacketed

## Agency Approvals

CE Mark: CE conformity is declared to: EN61326:1997 (annex A, industrial) including amendment A1:1998. EN55011 Group 1 Class A
*Declaration of Conformity available upon request*
* ULTEM® is a registered trademark of The General Electric Co.
**Available only in stainless steel-faced,**

### 1 m  range models

## *Accessories*

**Model AC130,** Straight, M12 micro, 4-conductor, connector/cable assembly, 5 m (16')
**Model AC132,** Right-angle, M12 micro, 4 conductor, connector /cable assembly, 5 m (16')
**Model AC233,** Small, right-angle, stainless, mounting bracket
**Model AC250-n,** Tank sensor  mounting reducer, available with four different outside diameters; used  with all SM900 family sensors. n = 1 (1 1/4" NPT); n = 2 (2" NPT); n = 3(3" NPT); n = 4(4" NPT)
**Model AC251-n,** Tank sensor mounting flange, available with three different pipe thread diameters, furnished with matching AC250 Tank sensor mounting reducer; used with all SM900 family sensors. n = 2  (2"NPT); 3(3"NPT); 4(4" NPT)
**Model AC441A,** Handheld Configurator

SUPERPROX® PROXIMITY SENSORS

| Model No. | Power Version 12/24 VDC | Connection Style: Cable | Connection Style: Connector | Sensing Range 51 mm - 1 m. / 2" - 39" | Sensing Range 120 mm - 2 m / 4.7" - 79" | Sensing Range 120 mm - 1 m / 4.7" - 39" | Sensing Range 203 mm - 7.6 m / 8" - 25' | Transducer Materials: Silicone | Stainless | Fluorosilicone | Epoxy | Housing: 30 mm ULTEM® | 30 mm stainless | Output Type: N.O. NPN & PNP | N.C. NPN & PNP | Complementary NPN | Complementary PNP | Response Time | Default Window | Special Features: Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SM900A-100000 | ■ | ■ | | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.25" | |
| SM900A-100000FS | ■ | ■ | | ■ | | | | | | ■ | | ■ | | ■ | | | | 20 ms | ± 0.25" | |
| SM900A-100000OB | ■ | ■ | | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.25" | Object Proximity Model |
| SM900A-100000S | ■ | ■ | | ■ | | | | ■ | | | | | ■ | ■ | | | | 20 ms | ± 0.25" | |
| SM900A-101000OB | ■ | ■ | | ■ | | | | ■ | | | | ■ | | ■ | | | | 10 ms | ± 0.25" | Object Proximity Model |
| SM900A-110000 | ■ | ■ | | ■ | | | | ■ | | | | ■ | | | ■ | | | 20 ms | ± 0.25" | |
| SM900A-120000 | ■ | ■ | | ■ | | | | ■ | | | | ■ | | | | ■ | | 20 ms | ± 0.25" | |
| SM900A-120001 | ■ | ■ | | ■ | | | | ■ | | | | ■ | | | | ■ | | 20 ms | ± 0.50" | |
| SM900A-130000 | ■ | ■ | | ■ | | | | ■ | | | | ■ | | | | | ■ | 20 ms | ± 0.25" | |
| SM900A-130000OBS | ■ | ■ | | ■ | | | | ■ | | | | | ■ | | | | ■ | 20 ms | ± 0.25" | Object Proximity Model |
| SM900A-400000 | ■ | ■ | | | ■ | | | ■ | | | | ■ | | ■ | | | | 30 ms | ± 0.25" | |
| SM900A-400000OB | ■ | ■ | | | ■ | | | ■ | | | | ■ | | ■ | | | | 30 ms | ± 0.25" | Object Proximity Model |
| SM900A-400000S | ■ | ■ | | | ■ | | | ■ | | | | | ■ | ■ | | | | 30 ms | ± 0.25" | |
| SM900A-420000 | ■ | ■ | | | ■ | | | ■ | | | | ■ | | | | ■ | | 30 ms | ± 0.25" | |
| SM900A-700000STS | ■ | ■ | | | | ■ | | | ■ | | | ■ | | ■ | | | | 20 ms | ± 0.25" | |
| SM900A-800000 | ■ | ■ | | | | | ■ | | | | ■ | ■ | | ■ | | | | 200 ms | ± 2.50" | |
| SM950A-100000 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.25" | |
| SM950A-100000FS | ■ | | ■ | ■ | | | | | | ■ | | ■ | | ■ | | | | 20 ms | ± 0.25" | |
| SM950A-100000OB | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.25" | Object Proximity Model |
| SM950A-100000S | ■ | | ■ | ■ | | | | ■ | | | | | ■ | ■ | | | | 20 ms | ± 0.25" | |
| SM950A-100001 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.50" | |
| SM950A-100002 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 1.00" | |
| SM950A-100003 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.10" | |
| SM950A-100003OB | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.10" | Object Proximity Model |
| SM950A-100005 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 20 ms | ± 0.125" | |
| SM950A-101000 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | ■ | | | | 10 ms | ± 0.25" | |
| SM950A-101000S | ■ | | ■ | ■ | | | | ■ | | | | | ■ | ■ | | | | 10 ms | ± 0.25" | |
| SM950A-102200 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | ■ | | | 100 ms | ± 0.25" | |
| SM950A-110000 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | ■ | | | 20 ms | ± 0.25" | |
| SM950A-110000S | ■ | | ■ | ■ | | | | ■ | | | | | ■ | | ■ | | | 20 ms | ± 0.25" | |
| SM950A-110003 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | ■ | | | 20 ms | ± 0.10" | |
| SM950A-115001 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | ■ | | | 1.0 s | ± 0.50" | |
| SM950A-120000 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | | ■ | | 20 ms | ± 0.25" | |
| SM950A-120000S | ■ | | ■ | ■ | | | | ■ | | | | | ■ | | | ■ | | 20 ms | ± 0.25" | |
| SM950A-120003OBS | ■ | | ■ | ■ | | | | ■ | | | | | ■ | | | ■ | | 20 ms | ± 0.10" | Object Proximity Model |
| SM950A-130000 | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | | | ■ | 20 ms | ± 0.25" | |
| SM950A-130000OB | ■ | | ■ | ■ | | | | ■ | | | | ■ | | | | | ■ | 20 ms | ± 0.25" | Object Proximity Model |
| SM950A-400000 | ■ | | ■ | | ■ | | | ■ | | | | ■ | | ■ | | | | 30 ms | ± 0.25" | |
| SM950A-400000S | ■ | | ■ | | ■ | | | ■ | | | | | ■ | ■ | | | | 30 ms | ± 0.25" | |
| SM950A-401002 | ■ | | ■ | | ■ | | | ■ | | | | ■ | | ■ | | | | 15 ms | ± 1.00" | |
| SM950A-402000 | ■ | | ■ | | ■ | | | ■ | | | | ■ | | ■ | | | | 100 ms | ± 0.25" | |
| SM950A-410000 | ■ | | ■ | | ■ | | | ■ | | | | ■ | | | ■ | | | 30 ms | ± 0.25" | |
| SM950A-420000 | ■ | | ■ | | ■ | | | ■ | | | | ■ | | | | ■ | | 30 ms | ± 0.25" | |
| SM950A-430000 | ■ | | ■ | | ■ | | | ■ | | | | ■ | | | | | ■ | 30 ms | ± 0.25" | |
| SM950A-4300005 | ■ | | ■ | | ■ | | | ■ | | | | | ■ | | | | ■ | 30 ms | ± 0.25" | |
| SM950A-700000STS | ■ | | ■ | | | ■ | | | ■ | | | ■ | | ■ | | | | 20 ms | ± 0.25" | |
| SM950A-800000 | ■ | | ■ | | | | ■ | | | | ■ | ■ | | ■ | | | | 200 ms | ± 2.50" | |

* ULTEM® is a registered trademark of The General Electric Co.
All possible sensor configurations are not listed here.